Globus.org: Hosted Service for Reliable Data Movement

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Today's Science Environments

- Large-scale collaborative science is becoming increasingly common

Fusion community's International ITER project

- Distributed community of users to access and analyze large amounts of data

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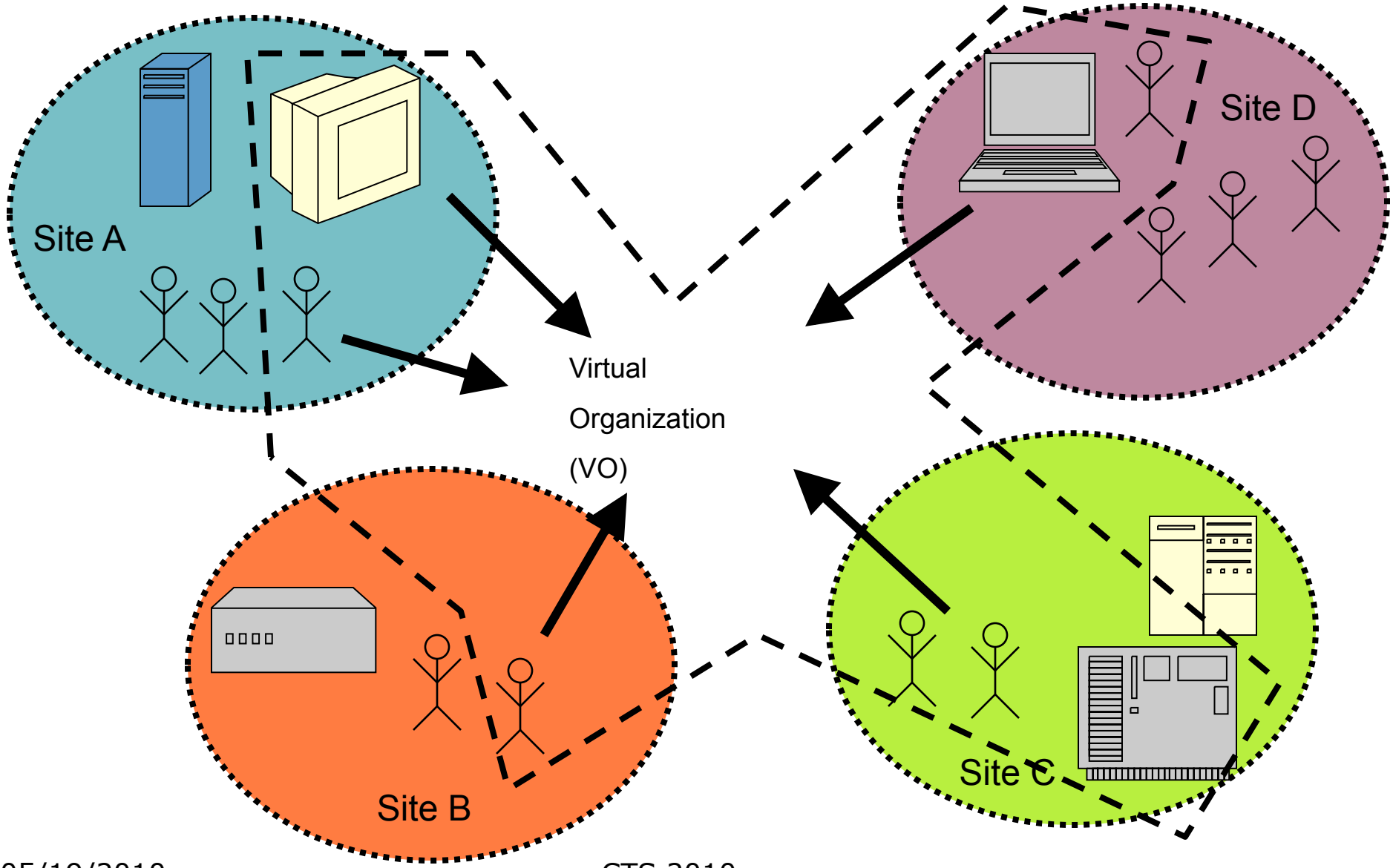
Large Hadron Collider

1800 Physicists, 150 Institutes, 32 Countries

100 PB of data by 20XX; 50,000 CPUs?

Virtual Organization



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Data Movement

- Raw simulation or observational data is just a starting point for most investigations
- Understanding comes from further analysis, reduction, visualization, and exploration

Petascale resource

Compute Cluster

Scientist's Desktop

- Furthermore the data is a community asset that must be accessible to any member of a distributed collaboration

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GridFTP

- High-performance, reliable data transfer protocol optimized for high-bandwidth wide-area networks
- Based on FTP protocol - defines extensions for high-performance operation and security
- Standardized through Open Grid Forum (OGF)
- GridFTP is the OGF recommended data movement protocol

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Globus GridFTP

- Performance
  - Parallel TCP streams, optimal TCP buffer
  - Non TCP protocol such as UDT
- Multi-node data movement
- Multiple security options
  - Anonymous, password, SSH, GSI
- Support for reliable and restartable transfers

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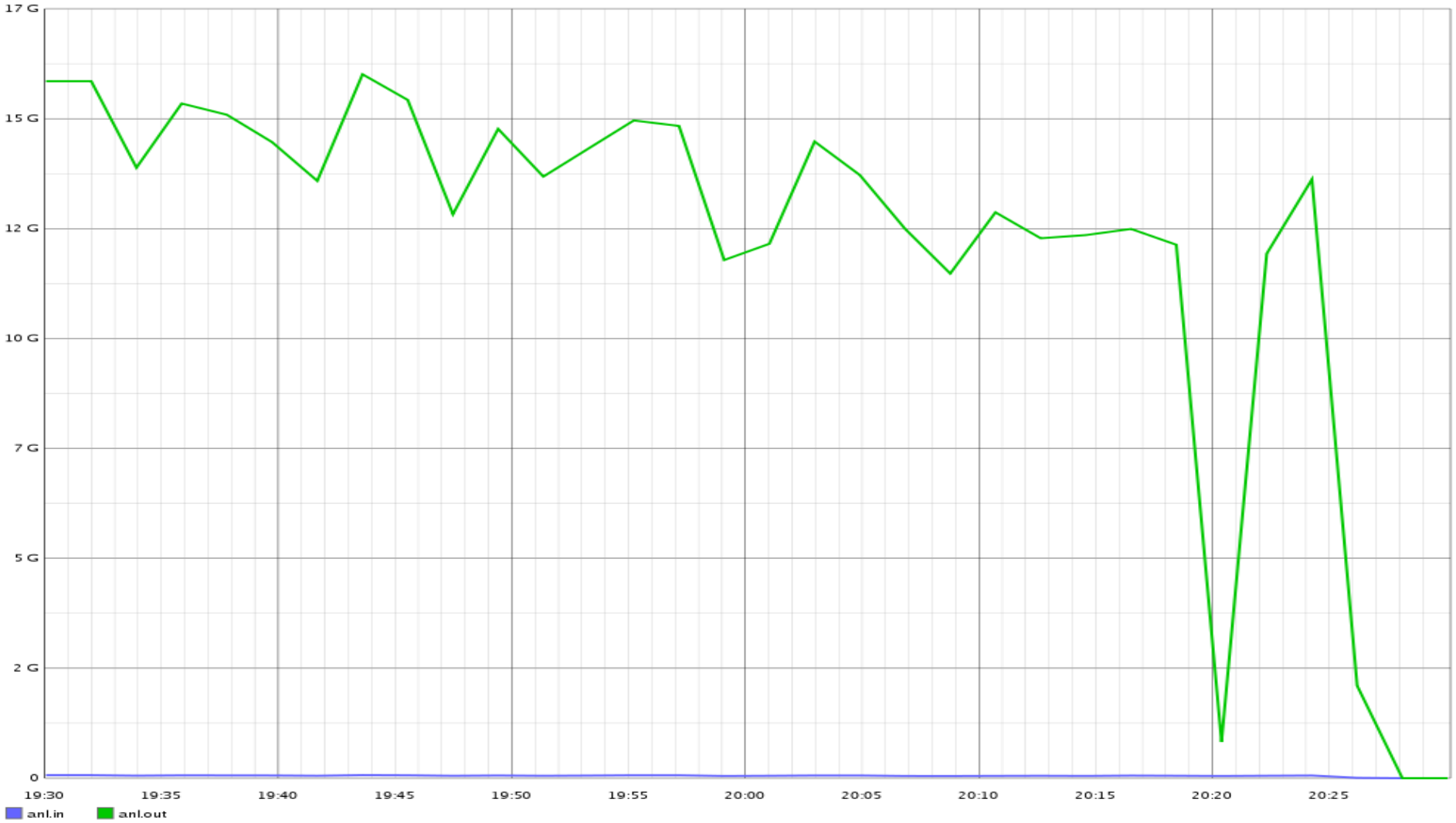
Performance



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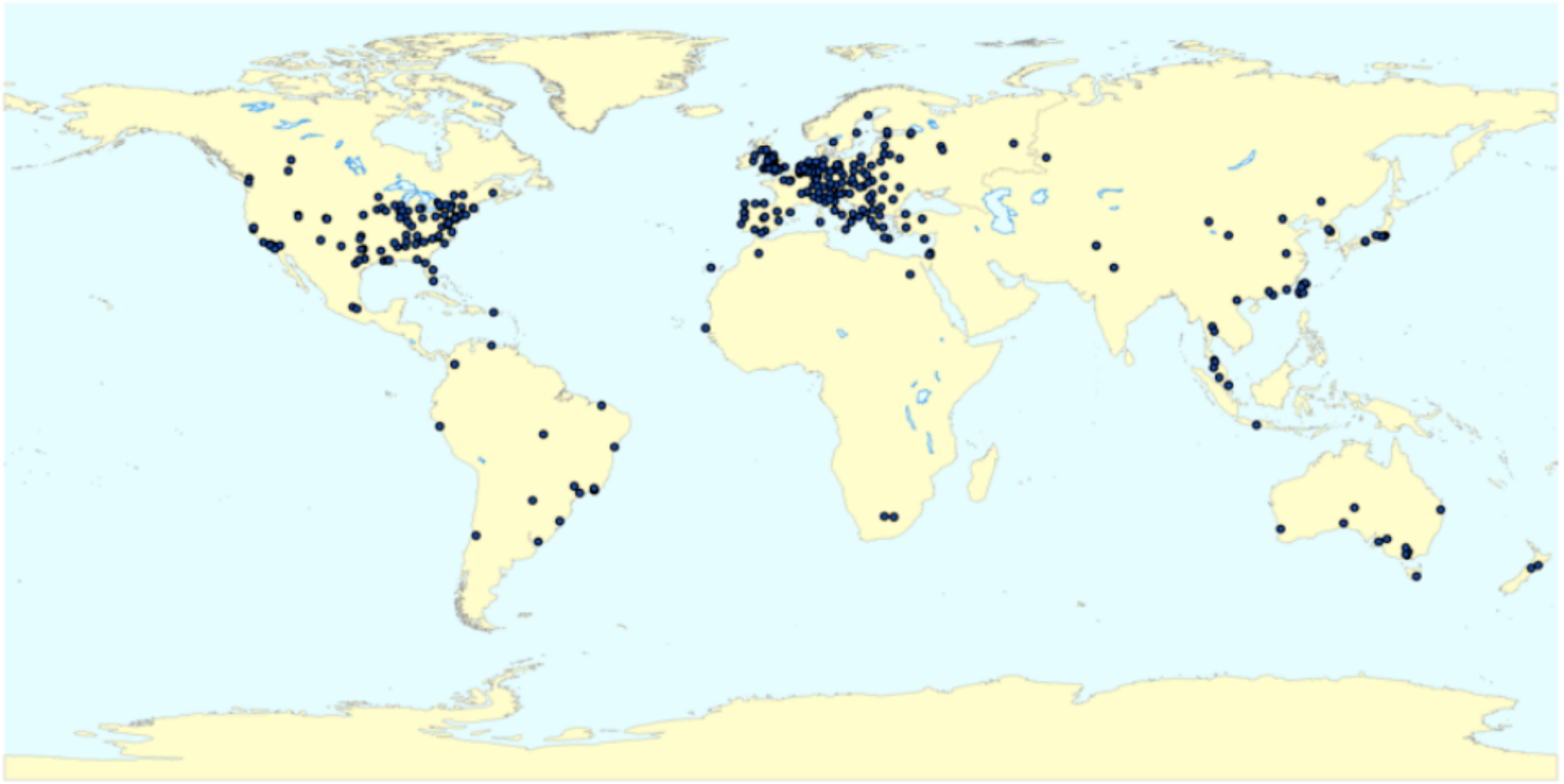
GridFTP Servers Around the World



Created by Tim Pinkawa (Northern Illinois University) using MaxMind's GeoIP technology (http://www.maxmind.com/app/ip-locate).

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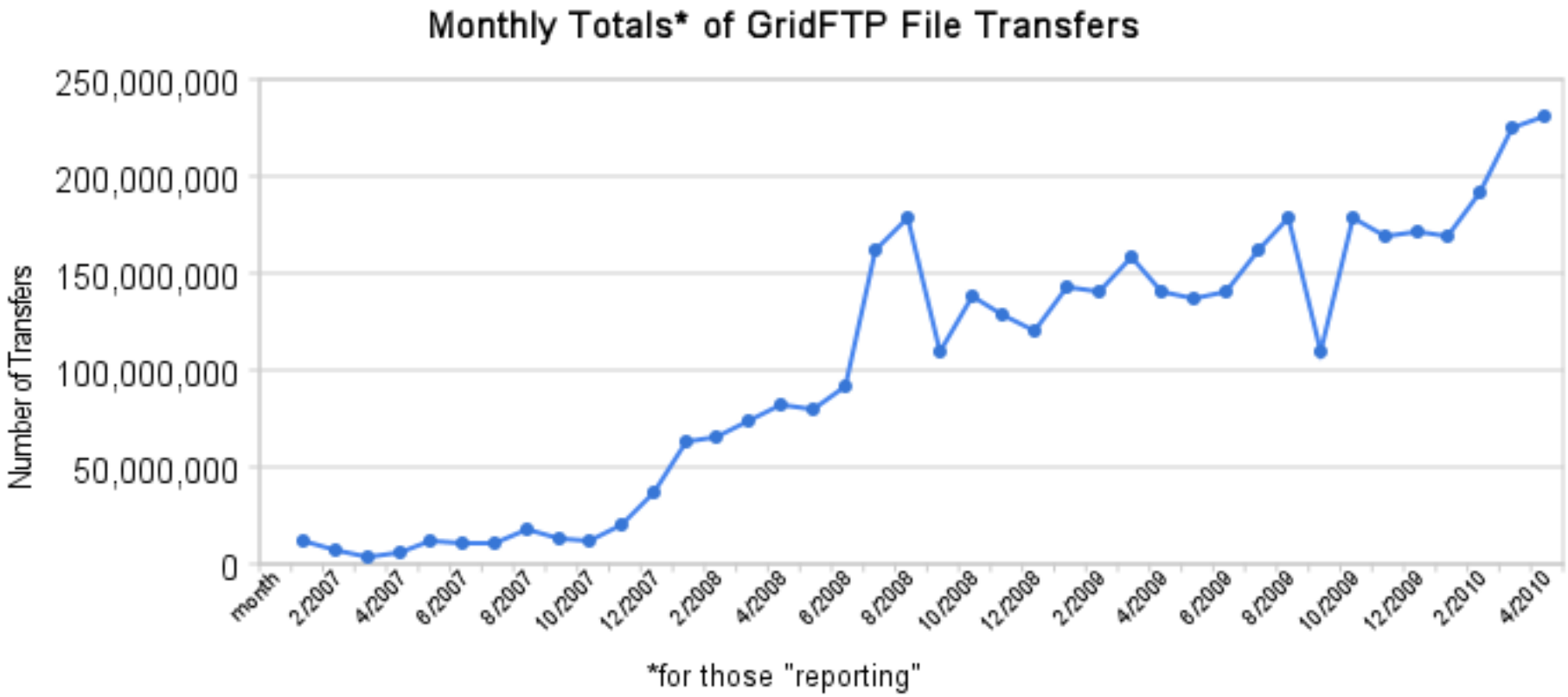
GridFTP Usage



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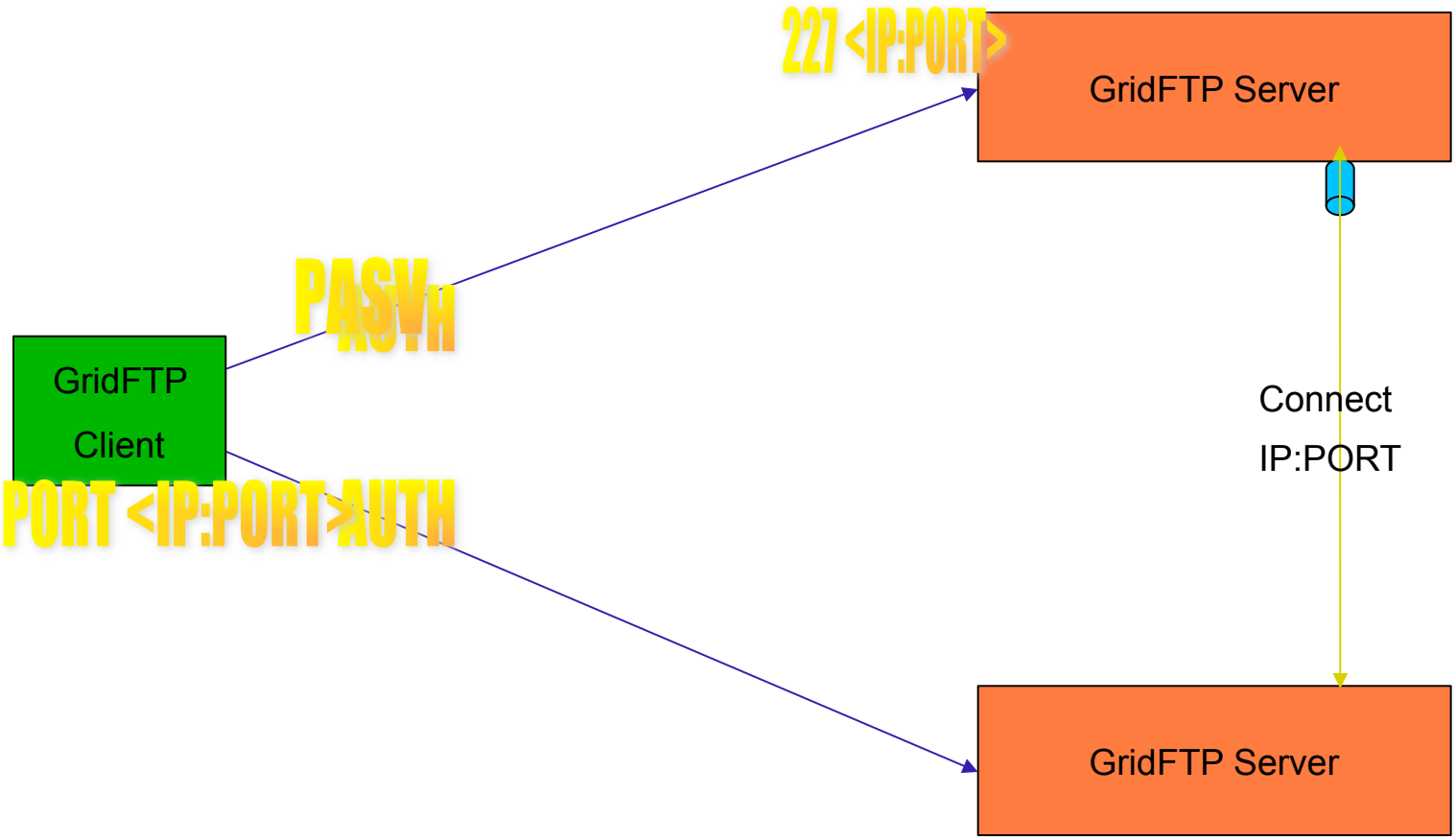
GridFTP Data Movement



Globus.org hosted services: Data replication as an example

"Move data from A to B"

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Notification agents

Transfer agents

Persistent database

Amazon Web Services

A

B

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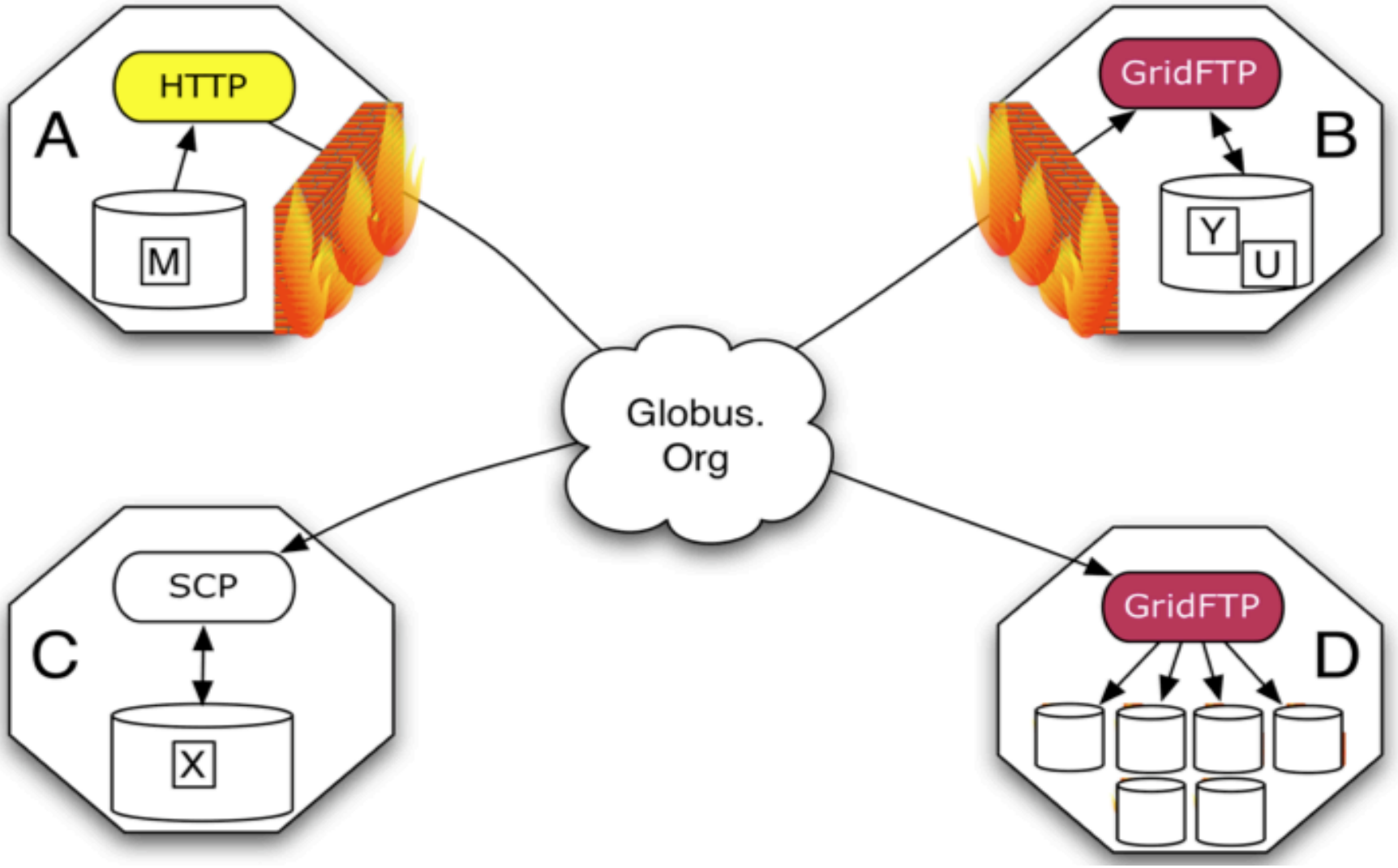

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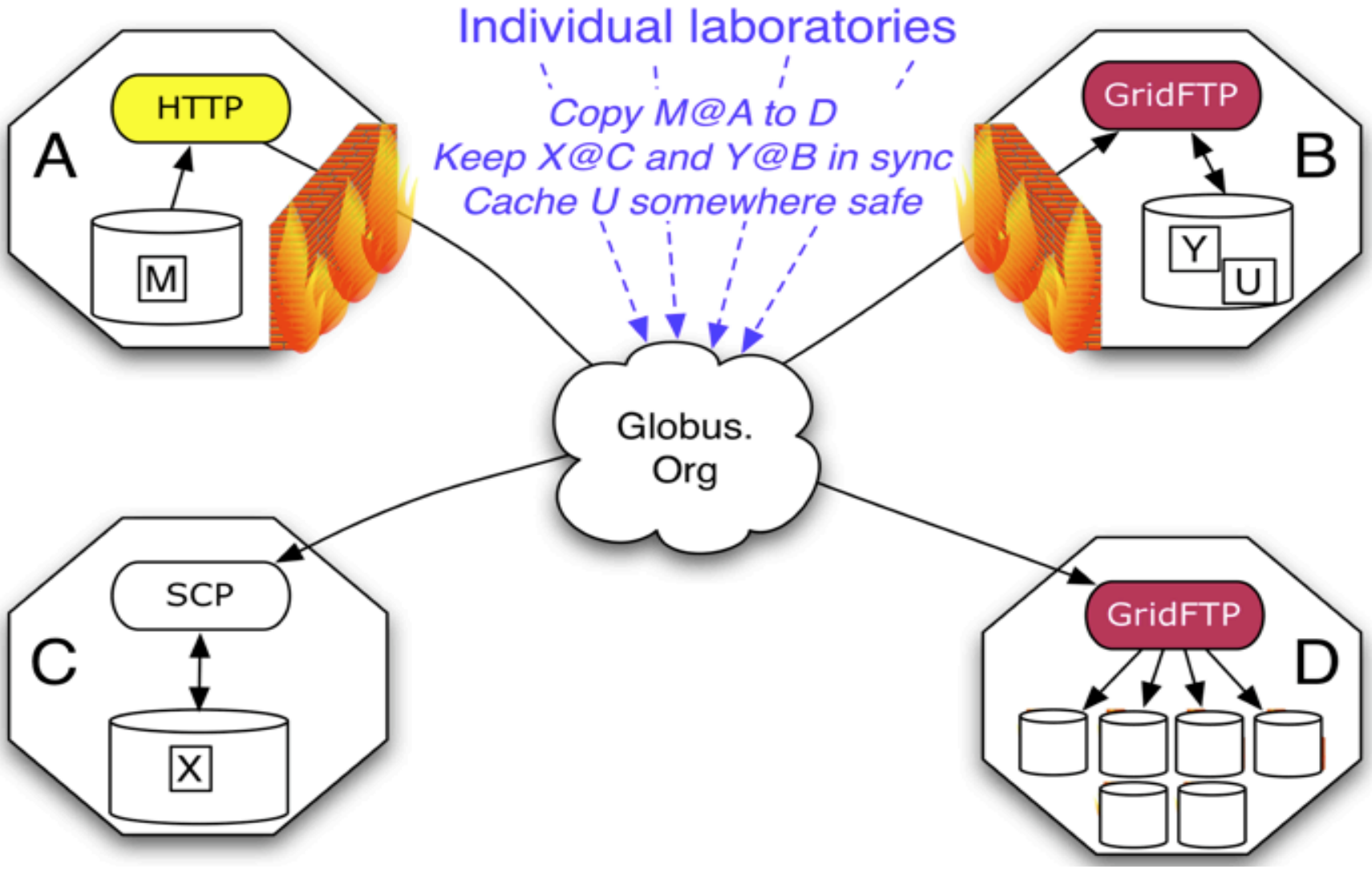

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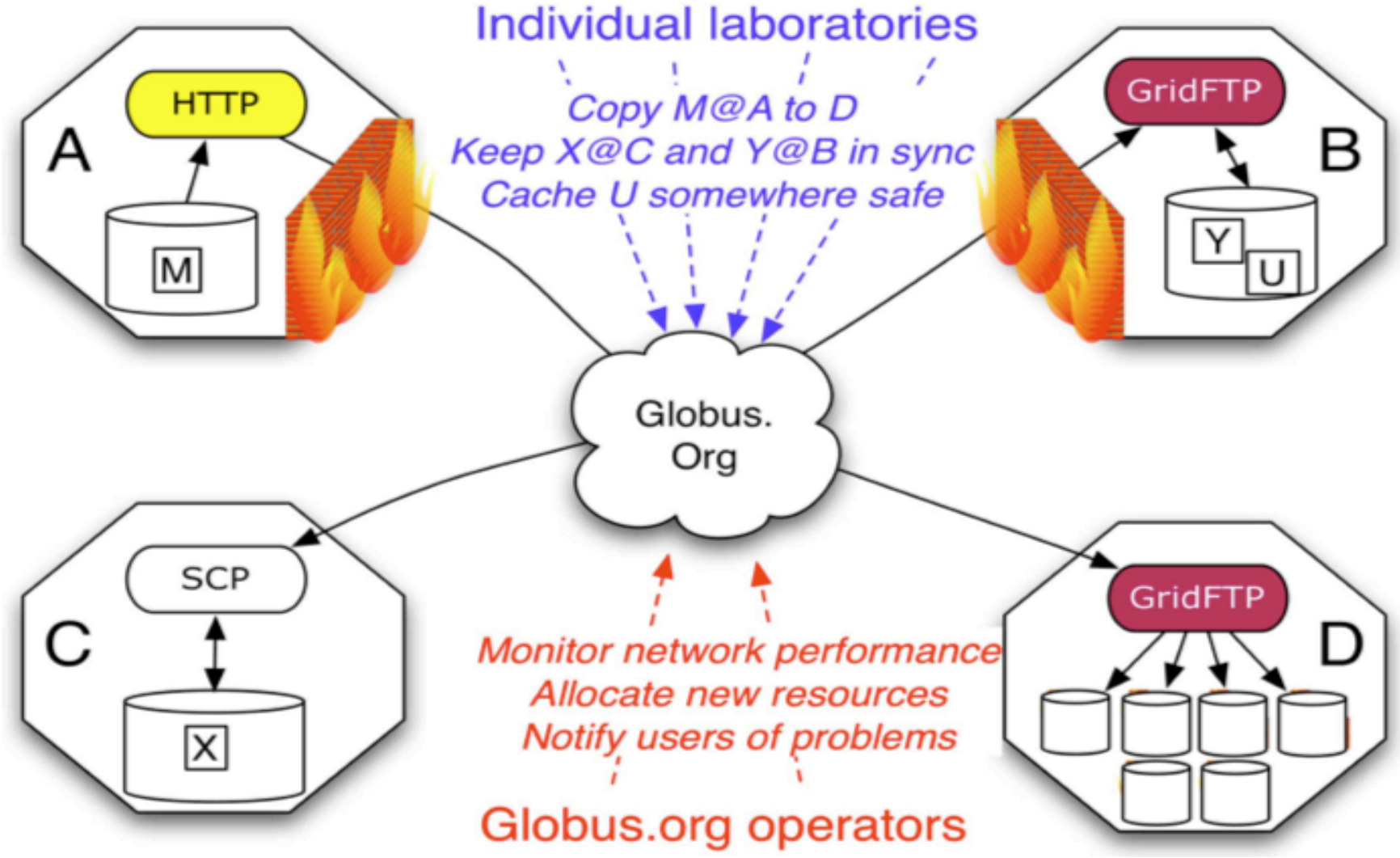
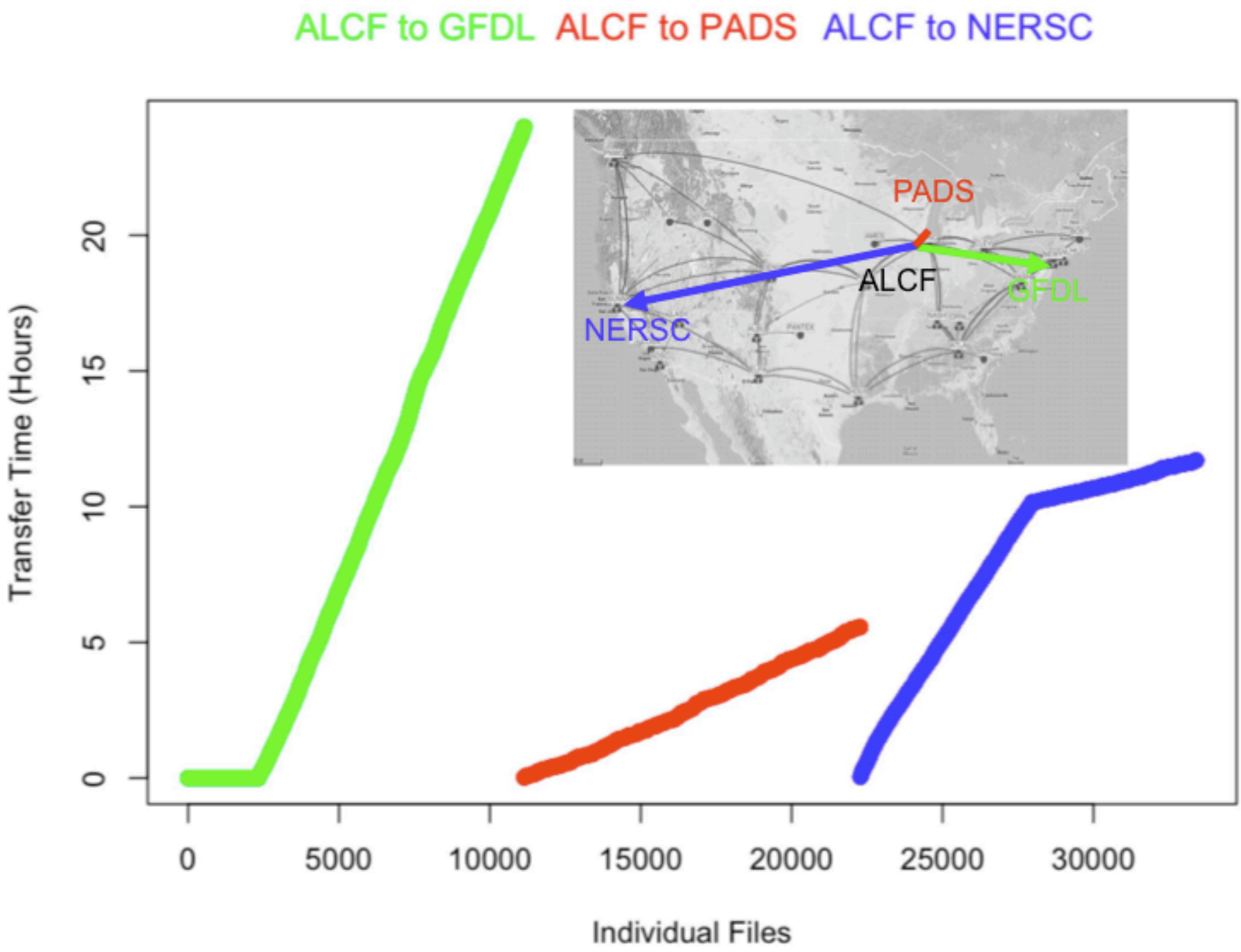
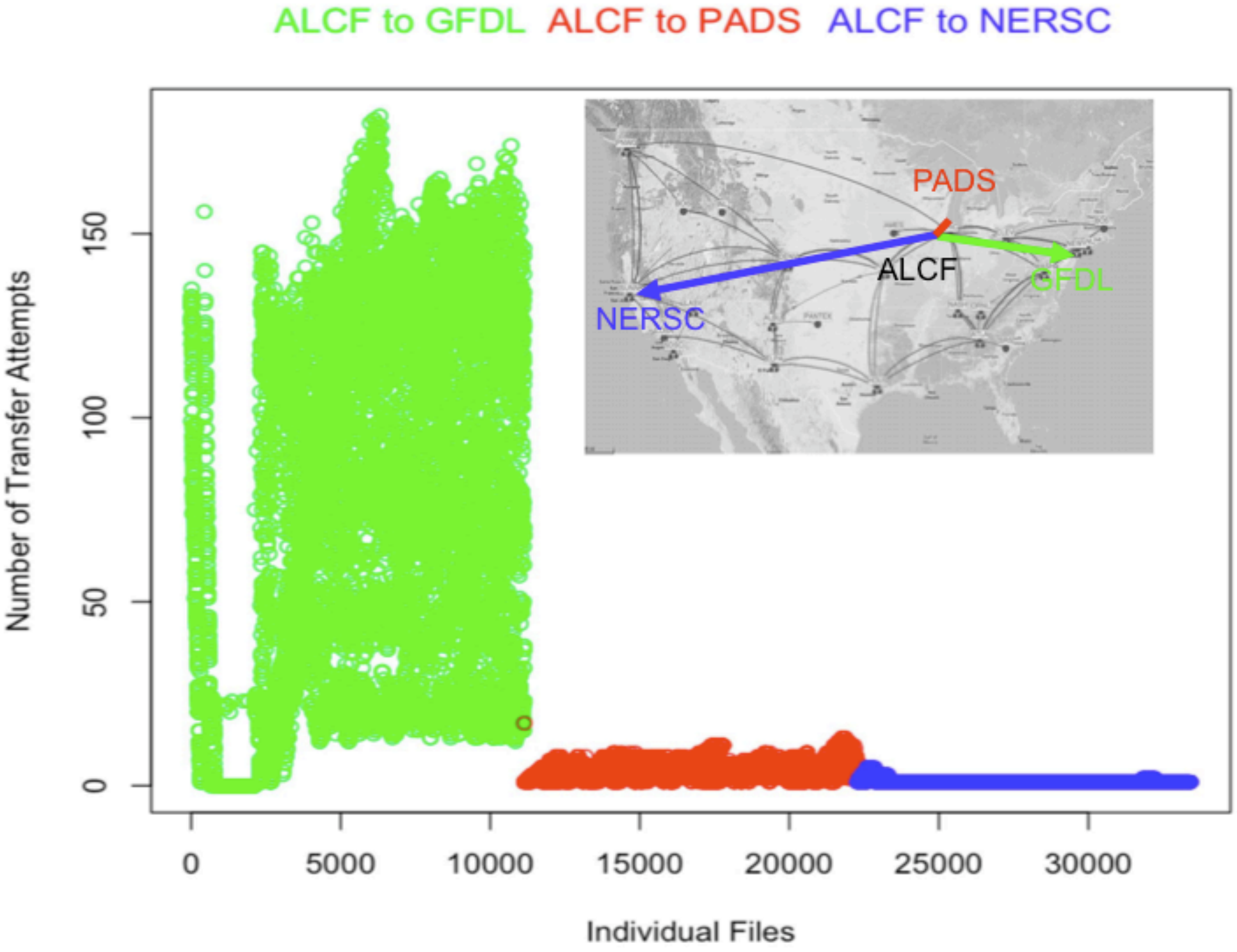



ALCF to GFDL
ALCF to PADS
ALCF to NERSC
PADS
ALCF
GFDL
NERSC
Transfer Time (Hours)
0
5
10
15
20
0
5000
10000
15000
20000
25000
30000
Individual Files


ALCF to GFDL
ALCF to PADS
ALCF to NERSC
Number of Transfer Attempts
0
50
100
150
0
5000
10000
15000
20000
25000
30000
Individual Files
PADS
ALCF
GFDL
NERSC

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More Information at
http://www.globus.org/service/
http://www.gridftp.org

Questions